IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	09/810,792
Applicant	:	Nathan G. Clark
Filed	:	03/16/2001
TC/A.U.	:	3641
Docket No.	:	990471 U2 USA
Title:		Oil Well Perforator Liner with High Proportion of Heavy Metal
Customer No.	:	01224
Confirmation No.	:	9172

RESPONSE TO OFFICE ACTION OF FEBRUARY 13, 2004

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the non-final Office Action mailed February 13, 2004, a Petition for Extension, a Terminal Disclaimer, and a Drawing Correction filed herewith, please amend the application as follows:

In the Specification:

On Page 1, lines 8-21:

A subterranean gas or oil well 30, as shown in Figure 3, typically begins with a hole 32 bored into the earth, which is then lined with joined lengths of relatively large diameter metal pipe. The casing 34 thus formed is generally cemented 36 to the face of the hole to give the well integrity and a path for producing fluids to the surface. Conventionally, the casing 34 and the cement 36 are subsequently perforated with chemical means, commonly explosives, in one or more locations of the surrounding formation from which it is desired to extract fluids. In general, the perforations 38 extend a distance into the formation 14. One of the problems inherent in the art is to maximize the depth of the penetration into the formation.

Explosive shaped charges known in the art generally have a substantially cylindrical or conical shape and are used in various arrangements in perforating tools 40 in the subterranean wells. Generally, a tubular perforating gun adapted for insertion into a well is used to carry a plurality of shaped charges to a subsurface location where perforation is desired. Upon detonation of the shaped charges, explosive jets emanate from the shaped charges with considerable velocity and perforate the well casing and surrounding formation.

On Page 4, lines 3-14

The apparatus and methods of the invention are shown generally in Figures 1 and 2. A conically symmetrical shaped charge 10 is shown. The shaped charge is sized for a perforating gun 40 commonly used to perforate subterranean wells 30 and formations 14, as seen in Figure 3. Typically, a plurality of shaped charges 10 are arranged in a substantially helical pattern on the perforating gun assembly 40. The exact size and shape 10 of the shaped charge 10 or the configuration of the perforating gun are not critical to the invention. The shaped charge 10 is enclosed by a case 12. Generally, the case 12 is substantially cylindrical or conical. As used herein, the term "conical" is used to refer to shapes substantially conical or in the form of frustum or truncated cone. Again, the exact shape of the case is not critical to the invention. In use, the perforating gun ~~(not shown)~~ is placed in a subterranean location where the perforation of the well casing 34 and/or formation 14 is desired, herein designed the target 14. The shaped charge has a muzzle 16, which is oriented toward the target 14, and the opposing closed end 18.